

## Is There Less Agreement About Inflation?

The Blue Chip forecasts for inflation come from a panel of forecasters who, each month, predict inflation for the current year and 1 year ahead. The size of the panel and its membership change over time; however, since 1993 the panel has never been smaller than 33 or larger than 54 members. The range of these forecasts—the highest forecast minus the lowest—is a measure of the level of agreement among panel members about future inflation. It is not a good measure of inflation uncertainty, though. In fact, greater inflation uncertainty could cause members' forecasts to converge, thereby making the range smaller, not larger.<sup>1</sup>

Charts A and B show the ranges of the panel's monthly CPI inflation forecasts for the past 15 years (1993-2007):

The lighter shading shows the area between the largest and smallest forecast ranges over the entire sample for that particular month of the year. (For example, the smallest range in January, 1.3 percentage points, occurred in both 1998 and 2000, and the largest range, 3.7 percentage points, occurred in 1997.)

The darker shading shows the area after the two largest and two smallest ranges have been deleted, which removes the effect of extreme observations. The darker area in chart A slopes down because, in each successive month, members have more information with which to forecast the current year's inflation.

The dashed line shows the monthly ranges for 2008. Agreement about current-year CPI inflation for 2008 began to deteriorate about midyear. Indeed, the July, August, and September ranges were higher than in any comparable months in the previous 15 years; and the November range is at the maximum for the entire period.

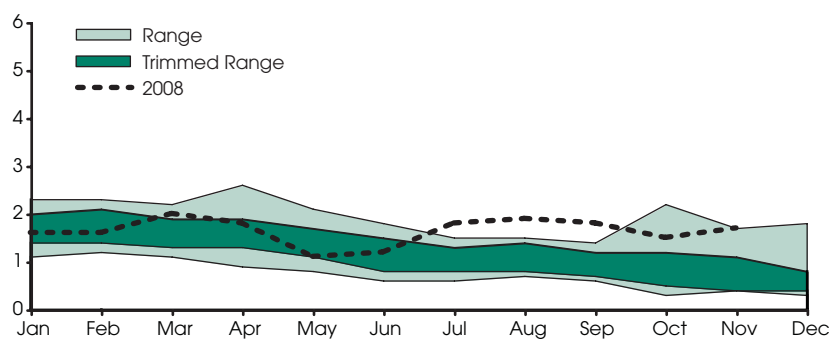
The 2008 ranges for the 1-year-ahead forecasts are also high, relative to the past 15 years. As with the current-year forecasts, disagreement about 2009 inflation appears

to have increased about midyear. Interestingly, the range of forecasts for November 2008 is much larger than in any November during the prior 15 years. This marked increase for 2009 inflation reflects the significant markdown made by many forecasters. For the 44 forecasters who participated in both the October and November panels, the average reduction for inflation is 1 percentage point. Moreover, several members are now forecasting deflation and a few anticipate significant deflation in 2009.

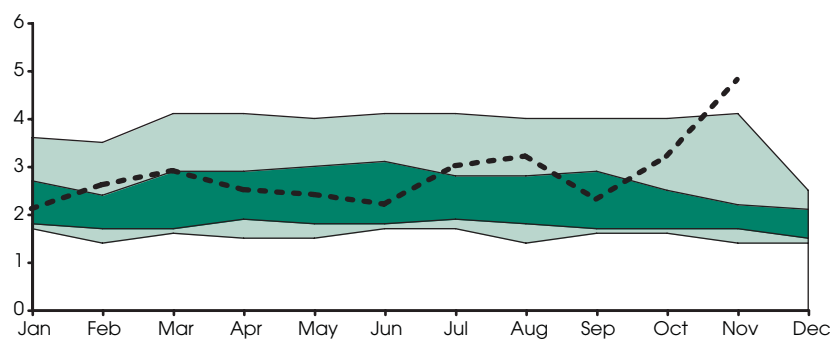
—Daniel L. Thornton

<sup>1</sup> See D'Amico, Stefania and Orphanides, Athanasios. "Uncertainty and Disagreement in Economic Forecasting." Finance and Economic Discussion Series, No. 2008-56, 2008; [www.federalreserve.gov/pubs/feds/2008/200856/200856pap.pdf](http://www.federalreserve.gov/pubs/feds/2008/200856/200856pap.pdf).

**A. Ranges of Forecasts for Current-Year CPI Inflation**



**B. Ranges of Forecasts for 1-Year-Ahead CPI Inflation**



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## Conventions used in this publication:

1. Unless otherwise indicated, data are monthly.
2. Shaded areas indicate recessions, as determined by the National Bureau of Economic Research.
3. *Percent change at an annual rate* is the simple, not compounded, monthly percent change multiplied by 12. For example, using consecutive months, the percent change at an annual rate in  $x$  between month  $t-1$  and the current month  $t$  is:  $[(x_t/x_{t-1})-1] \times 1200$ . Note that this differs from *National Economic Trends*. In that publication, monthly percent changes are compounded and expressed as annual growth rates.
4. The *percent change from year ago* refers to the percent change from the same period in the previous year. For example, the percent change from year ago in  $x$  between month  $t-12$  and the current month  $t$  is:  $[(x_t/x_{t-12})-1] \times 100$ .

We welcome your comments addressed to:

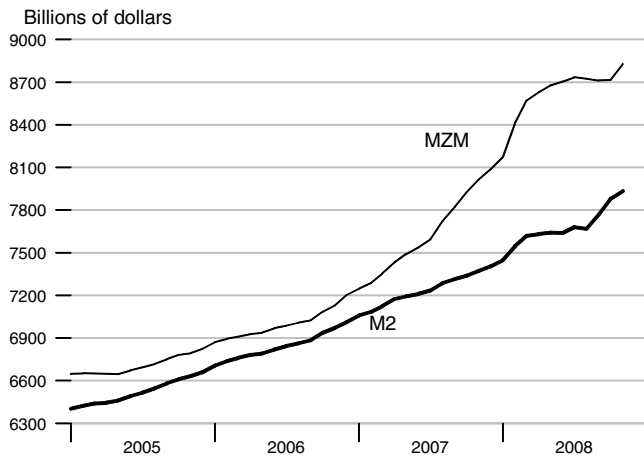
Editor, *Monetary Trends*  
Research Division  
Federal Reserve Bank of St. Louis  
P.O. Box 442  
St. Louis, MO 63166-0442

On March 23, 2006, the Board of Governors of the Federal Reserve System ceased the publication of the M3 monetary aggregate. It also ceased publishing the following components: large-denomination time deposits, RPs, and eurodollars.

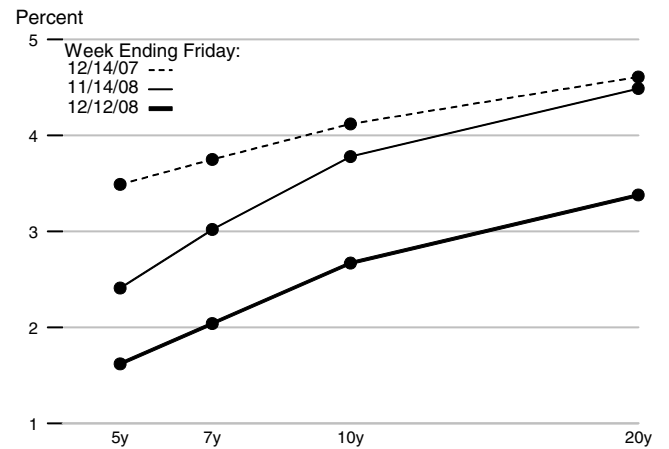
or to:

stlsFRED@stls.frb.org

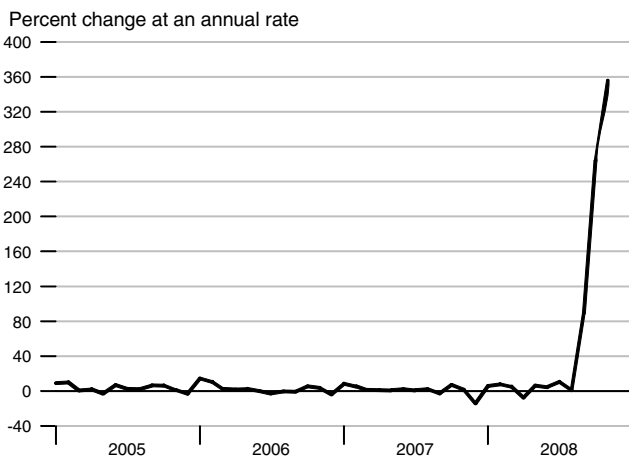
## M2 and MZM



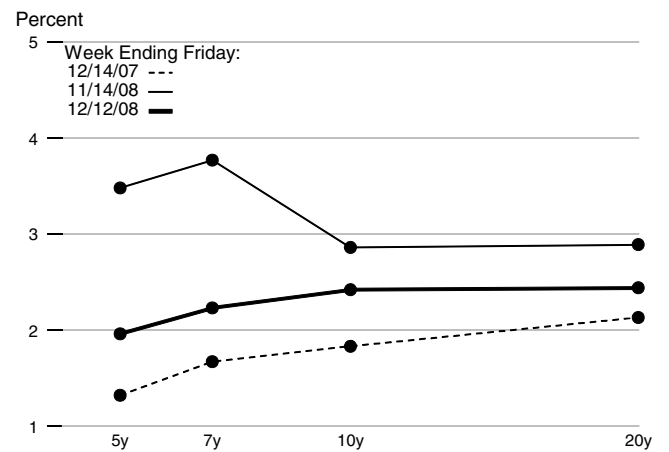
## Treasury Yield Curve



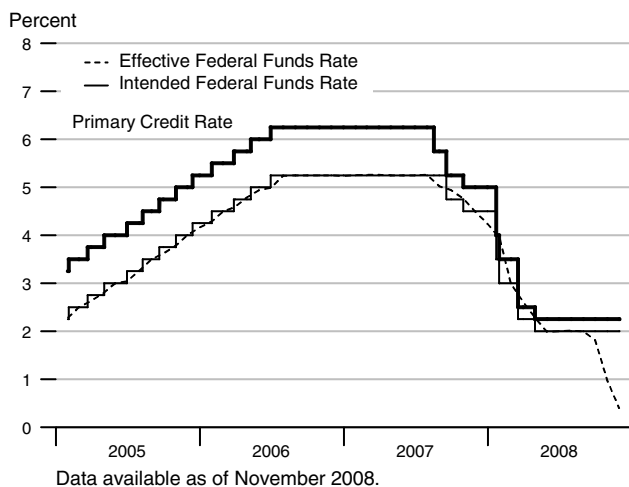
## Adjusted Monetary Base



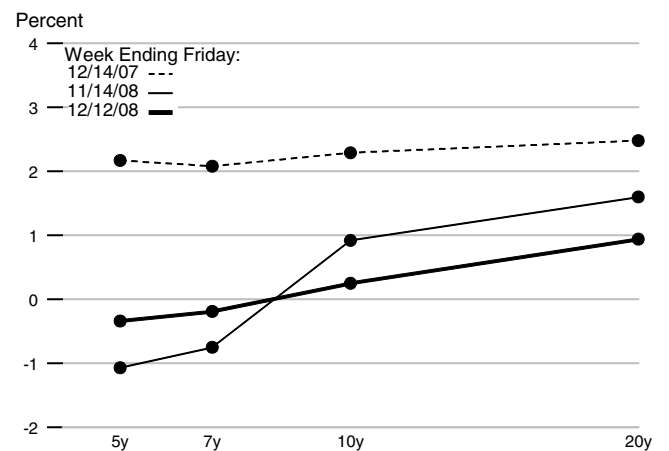
## Real Treasury Yield Curve



## Reserve Market Rates

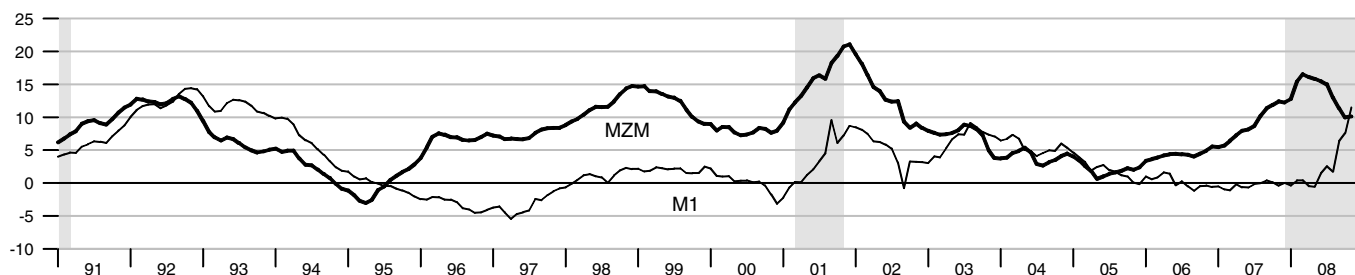


## Inflation-Indexed Treasury Yield Spreads



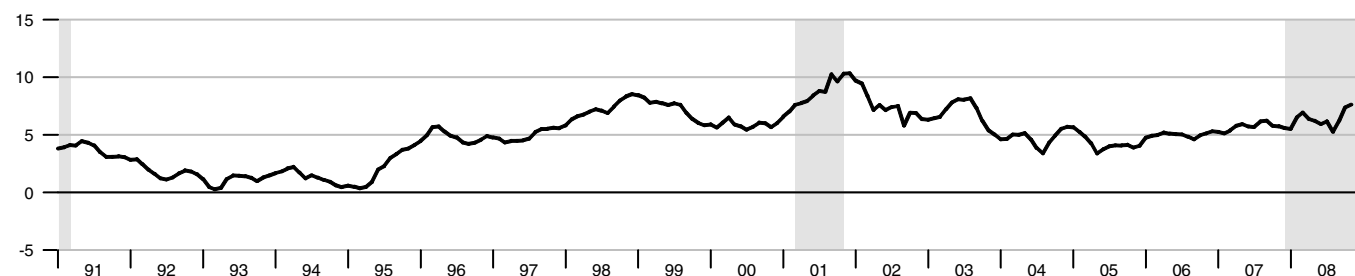
## MZM and M1

Percent change from year ago



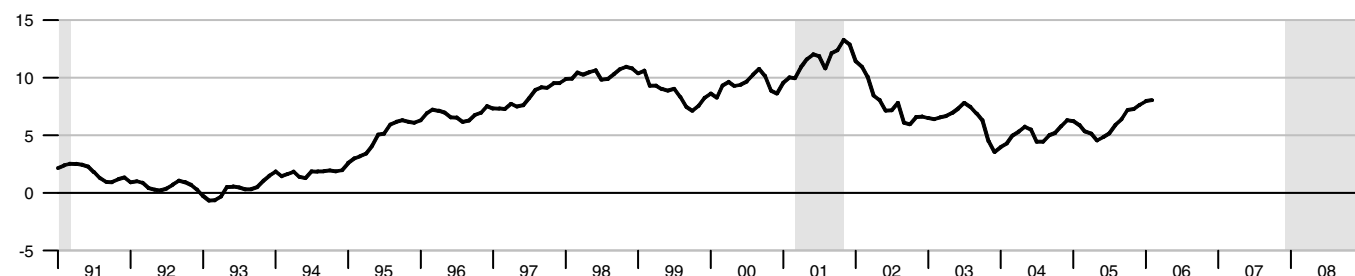
## M2

Percent change from year ago



## M3\*

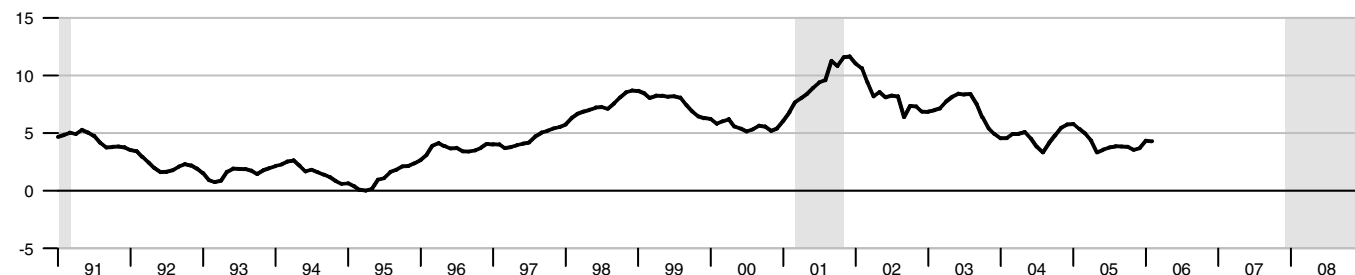
Percent change from year ago



\*See table of contents for changes to the series.

## Monetary Services Index - M2\*\*

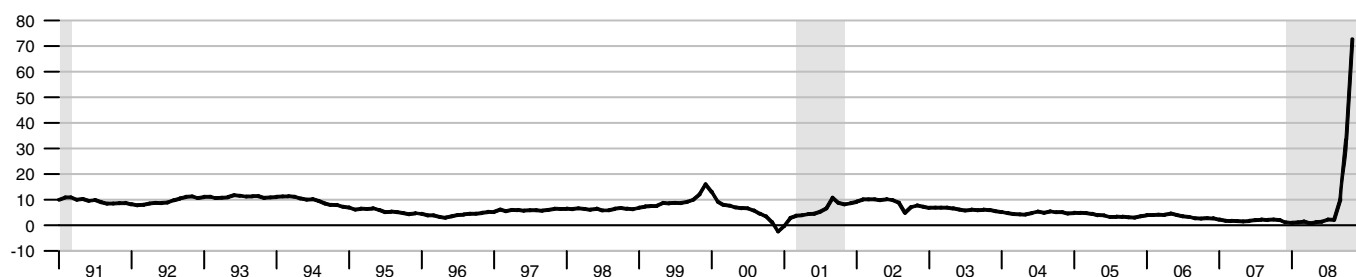
Percent change from year ago



\*\*We will not update the MSI series until we revise the code to accommodate the discontinuation of M3.

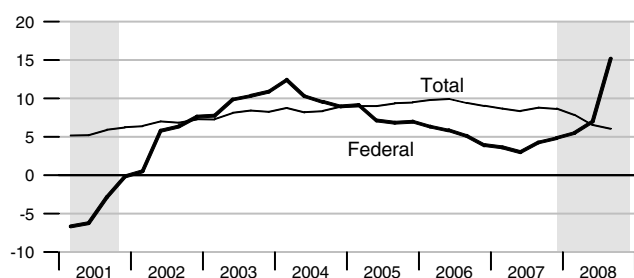
## Adjusted Monetary Base

Percent change from year ago



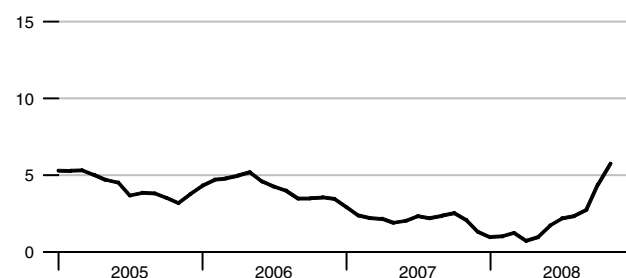
## Domestic Nonfinancial Debt

Percent change from year ago



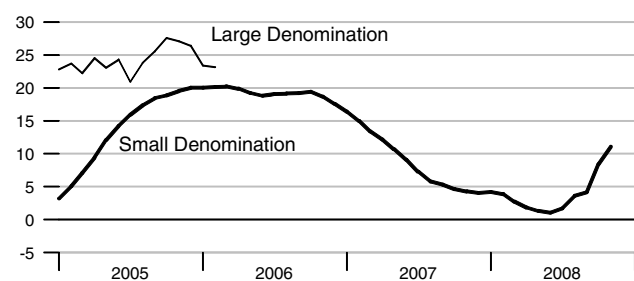
## Currency Held by the Nonbank Public

Percent change from year ago



## Time Deposits\*

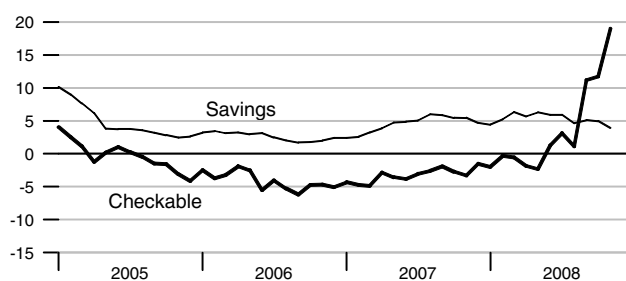
Percent change from year ago



\*See table of contents for changes to the series.

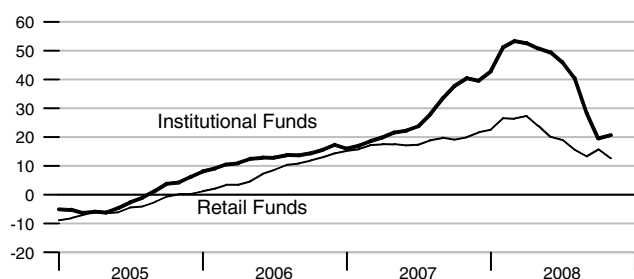
## Checkable and Savings Deposits

Percent change from year ago



## Money Market Mutual Fund Shares

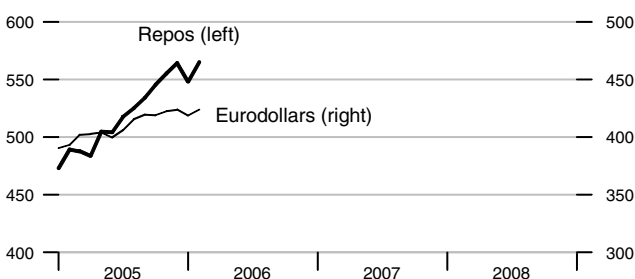
Percent change from year ago



## Repurchase Agreements and Eurodollars\*

Billions of dollars

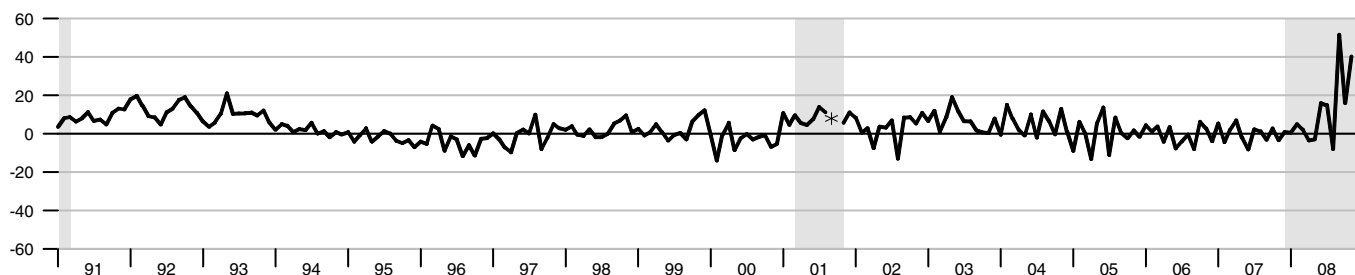
Billions of dollars



\*See table of contents for changes to these series.

## M1

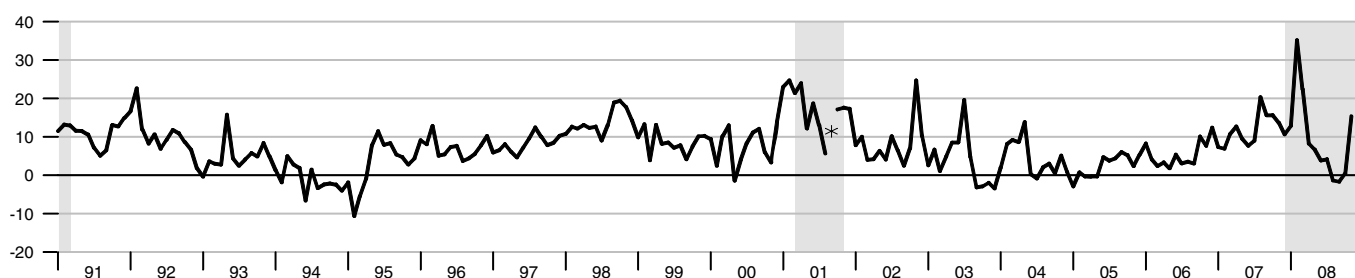
Percent change at an annual rate



\*Actual values for September and October 2001 are 55.87 and -38.35 percent rate, respectively.

## M2M

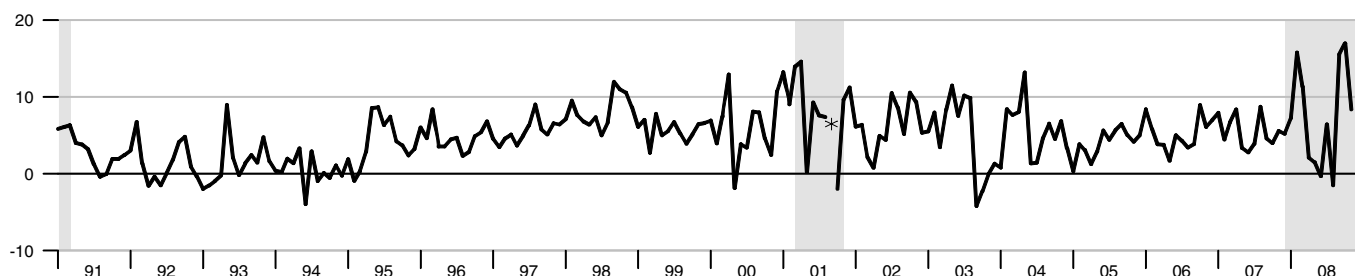
Percent change at an annual rate



\*Actual value for September 2001 is 39.41 percent rate.

## M2

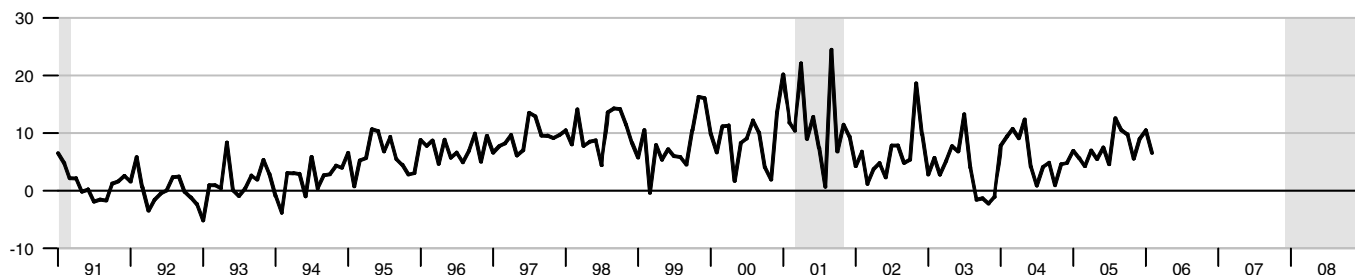
Percent change at an annual rate



\*Actual value for September 2001 is 24.90 percent rate.

## M3\*

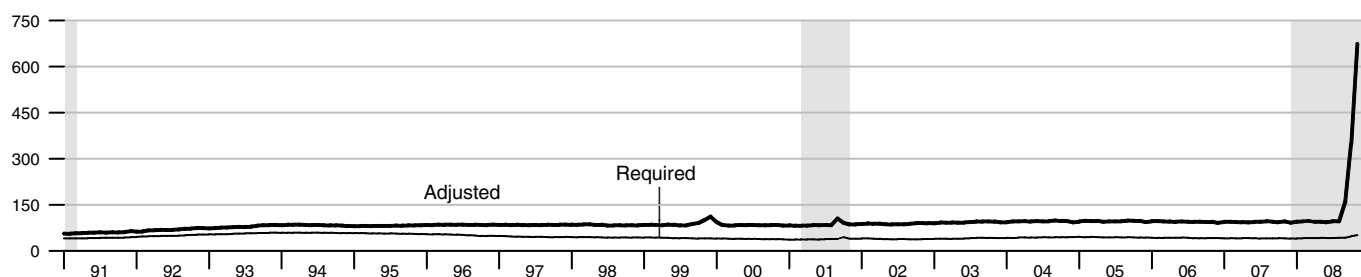
Percent change at an annual rate



\*See table of contents for changes to the series.

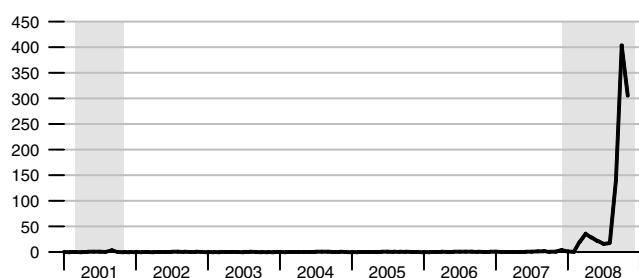
## Adjusted and Required Reserves

Billions of dollars



## Total Borrowings, nsa

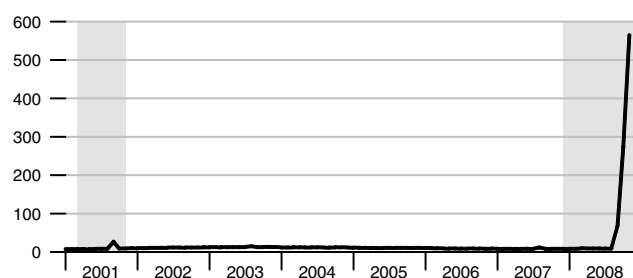
Billions of dollars



\* Data exclude term auction credit

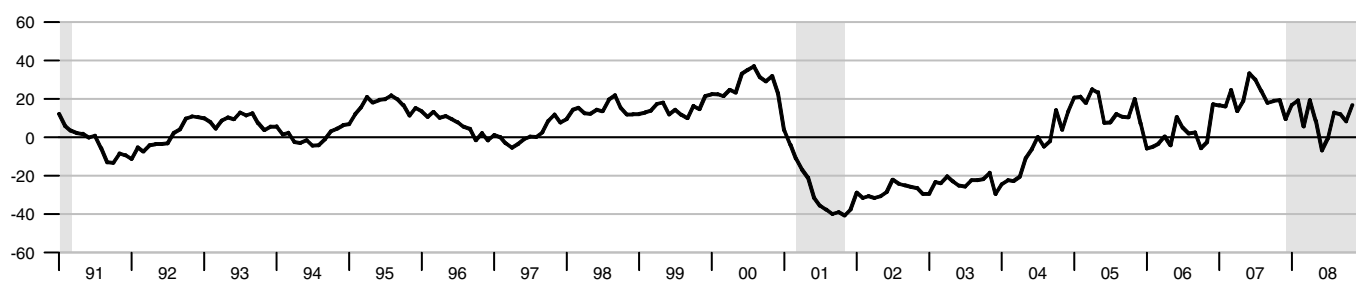
## Excess Reserves plus RCB Contracts

Billions of dollars



## Nonfinancial Commercial Paper

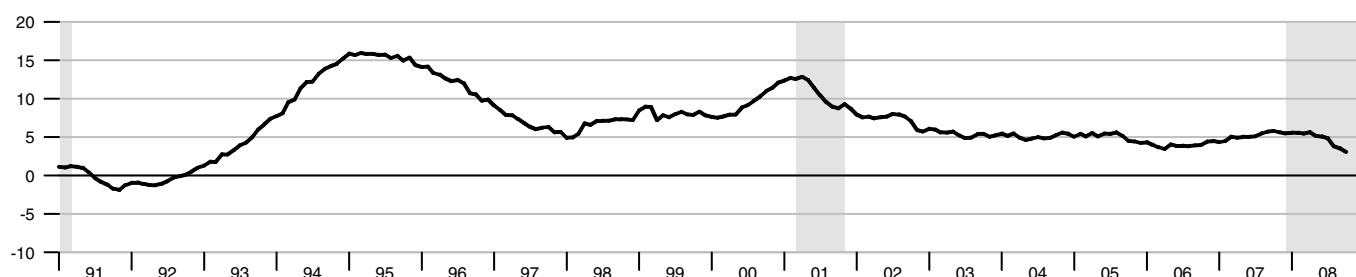
Percent change from year ago



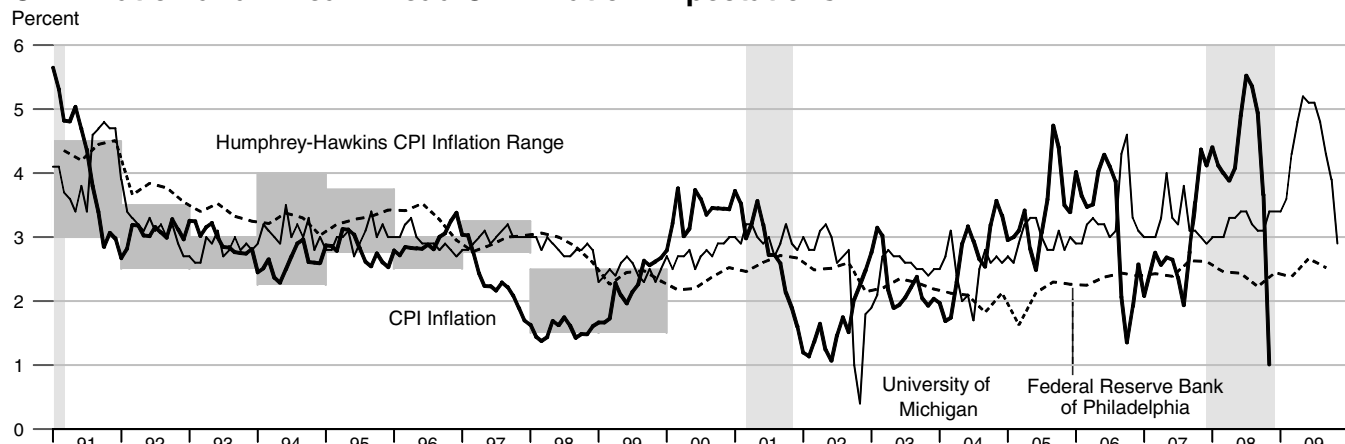
As of April 10, 2006, the Federal Reserve Board made major changes to its commercial paper calculations.  
For more information, please refer to <http://www.federalreserve.gov/releases/cp/about.htm>.

## Consumer Credit

Percent change from year ago

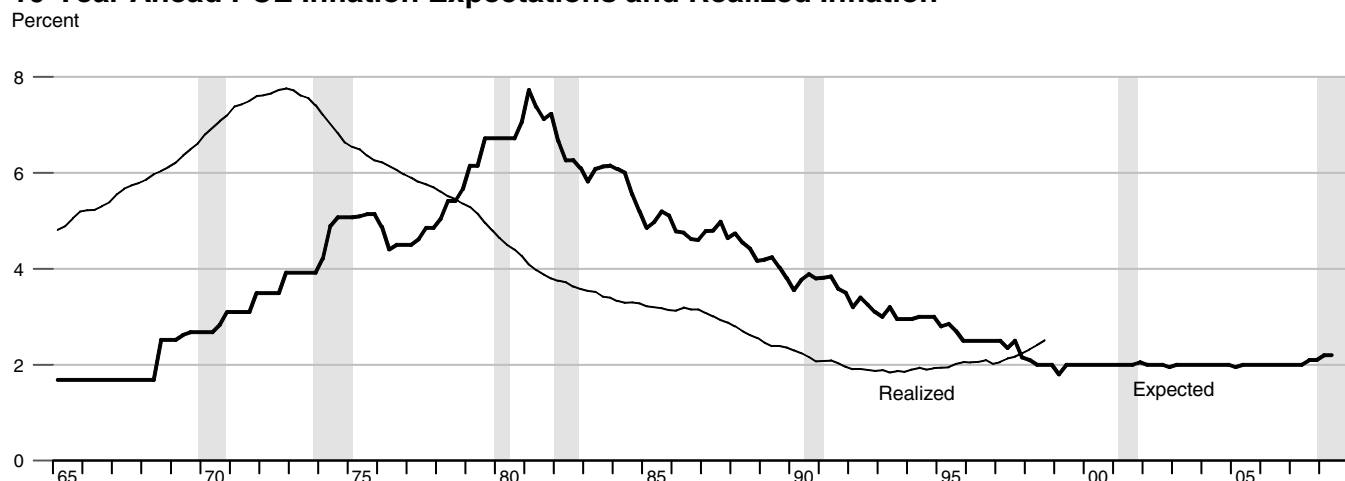


# CPI Inflation and 1-Year-Ahead CPI Inflation Expectations



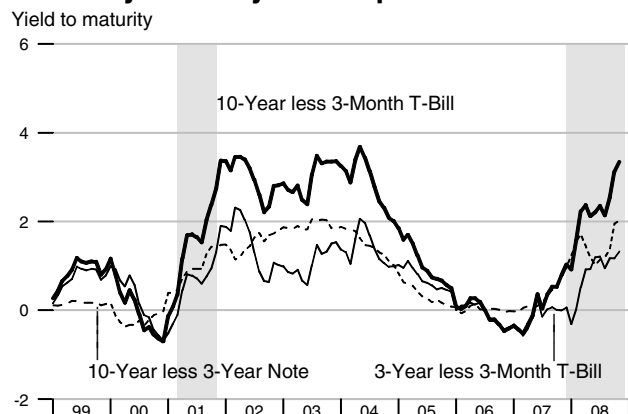
The shaded region shows the Humphrey-Hawkins CPI inflation range. Beginning in January 2000, the Humphrey-Hawkins inflation range was reported using the PCE price index and therefore is not shown on this graph.

# 10-Year Ahead PCE Inflation Expectations and Realized Inflation



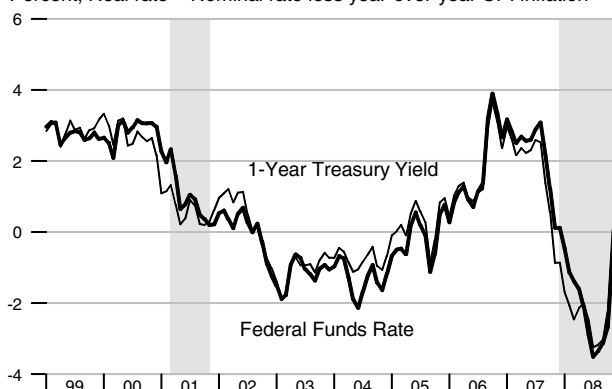
See notes on page 19.

# Treasury Security Yield Spreads



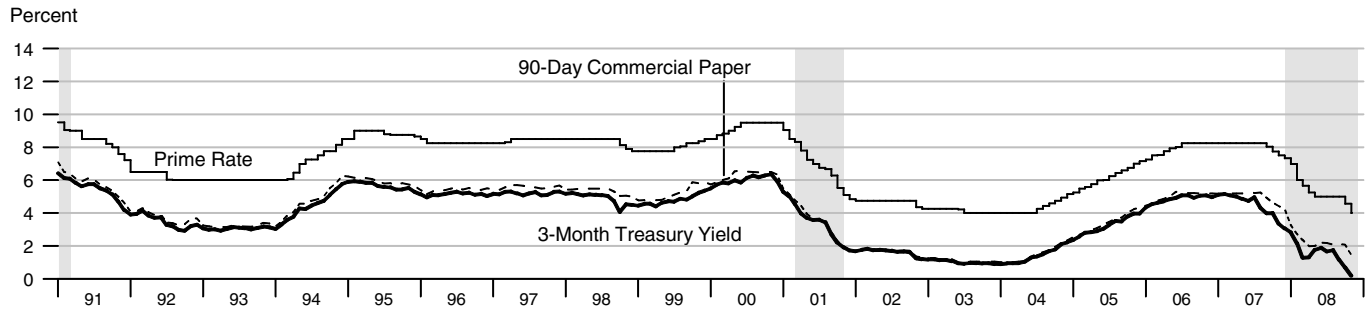
# Real Interest Rates

Percent, Real rate = Nominal rate less year-over-year CPI inflation

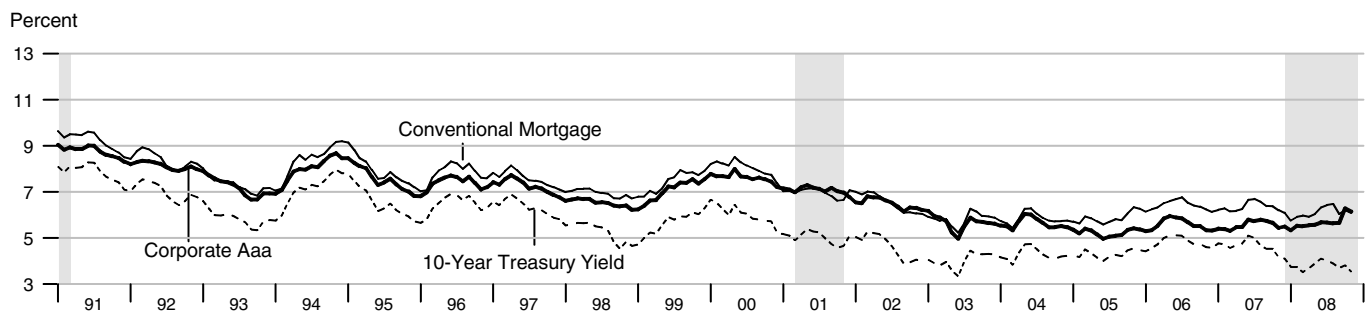




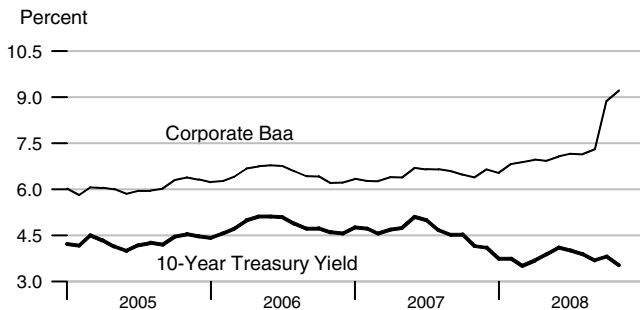
## Short-Term Interest Rates



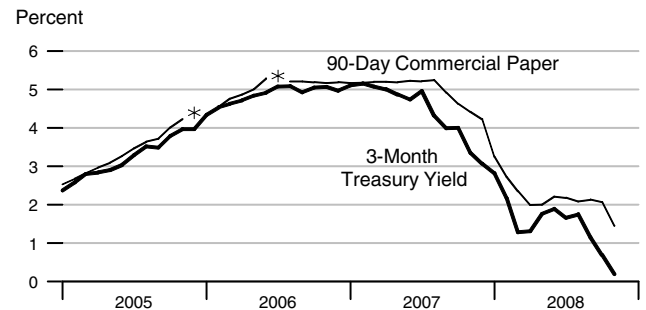
## Long-Term Interest Rates



## Long-Term Interest Rates

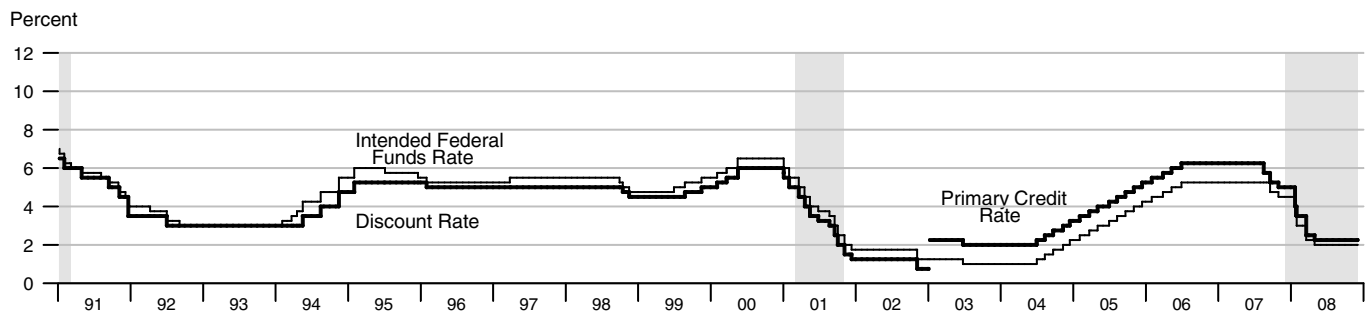


## Short-Term Interest Rates



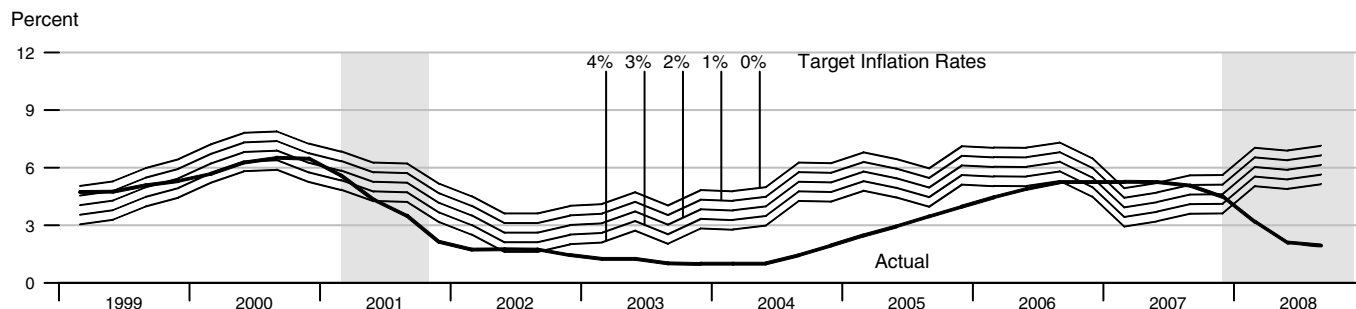
\*90-Day Commercial Paper data are not available for December 2005, January 2006, and July 2006.

## FOMC Intended Federal Funds Rate, Discount Rate, and Primary Credit Rate



Data available as of November 2008.

## Federal Funds Rate and Inflation Targets



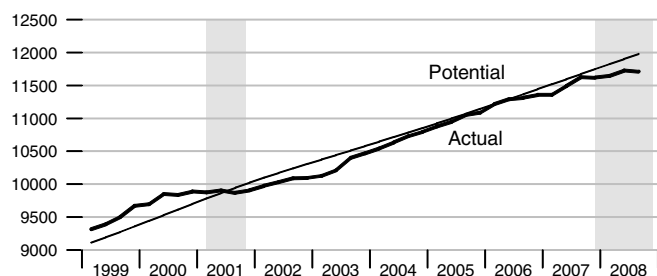
Calculated federal funds rate is based on Taylor's rule.

See notes on page 19.

## Components of Taylor's Rule

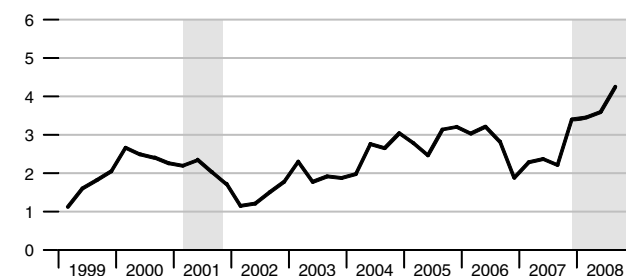
### Actual and Potential Real GDP

Billions of chain-weighted 2000 dollars



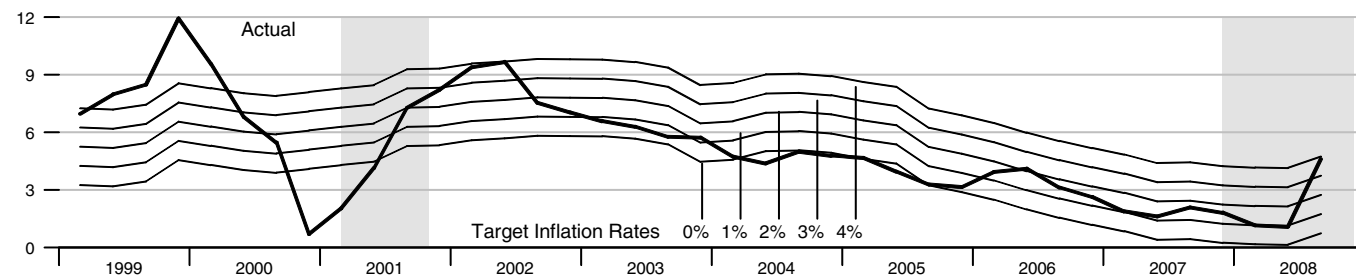
### PCE Inflation

Percent change from year ago



## Monetary Base Growth\* and Inflation Targets

Percent



\*Modified for the effects of sweeps programs on reserve demand.

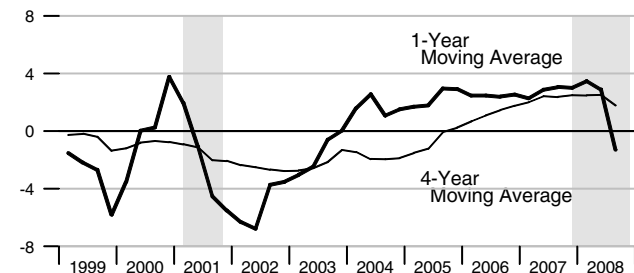
Calculated base growth is based on McCallum's rule. Actual base growth is percent change from year ago.

See notes on page 19.

## Components of McCallum's Rule

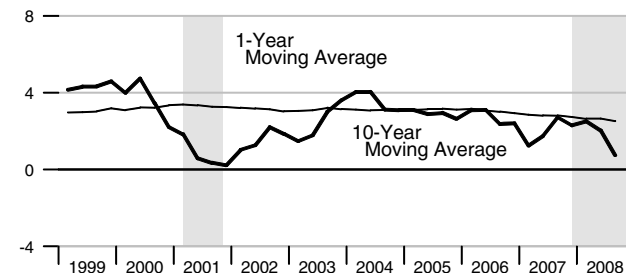
### Monetary Base Velocity Growth

Percent

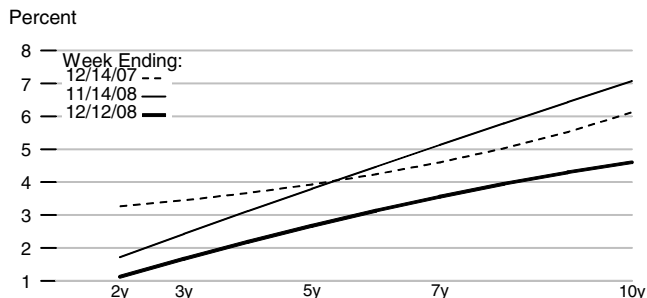


### Real Output Growth

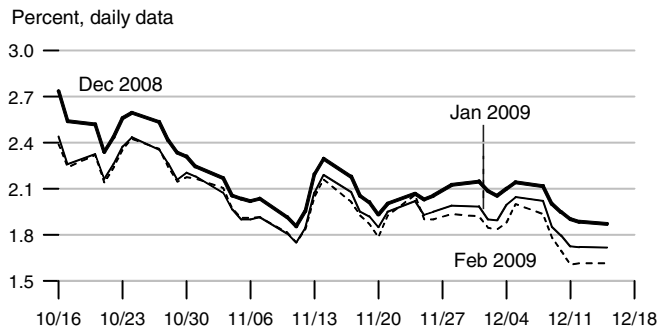
Percent



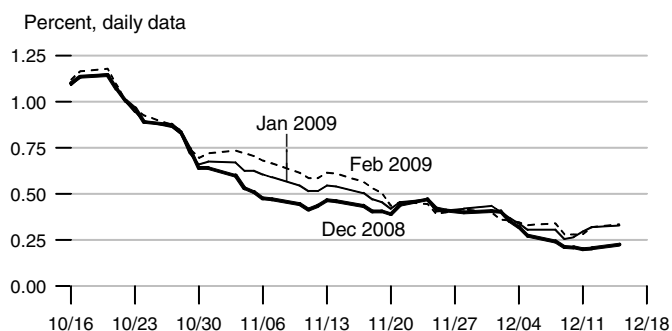
## Implied One-Year Forward Rates



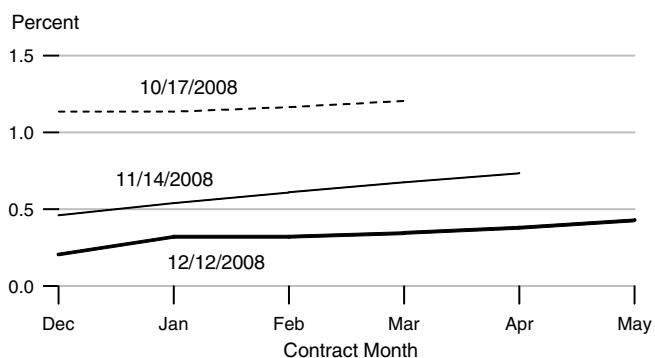
## Rates on 3-Month Eurodollar Futures



## Rates on Selected Federal Funds Futures Contracts

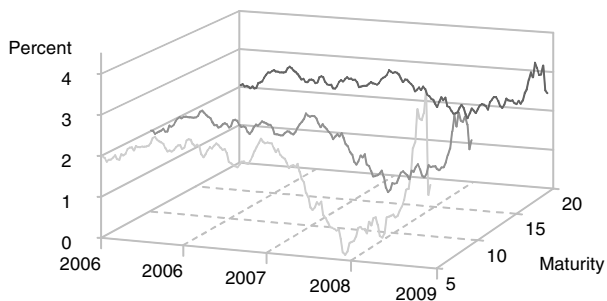


## Rates on Federal Funds Futures on Selected Dates



## Inflation-Indexed Treasury Securities

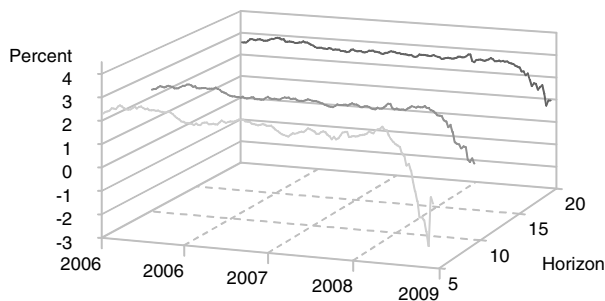
Weekly data



Note: Yields are inflation-indexed constant maturity U.S. Treasury securities

## Inflation-Indexed Treasury Yield Spreads

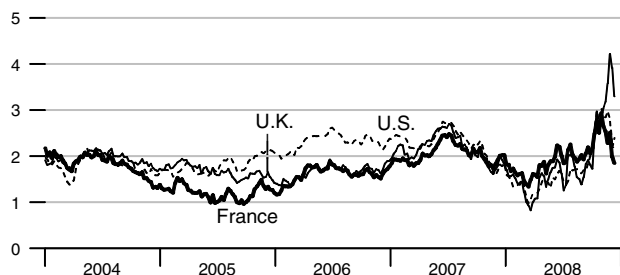
Weekly data



Note: Yield spread is between nominal and inflation-indexed constant maturity U.S. Treasury securities.

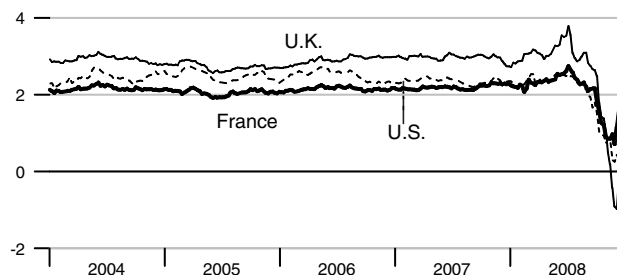
## Inflation-Indexed 10-Year Government Notes

Percent, weekly data



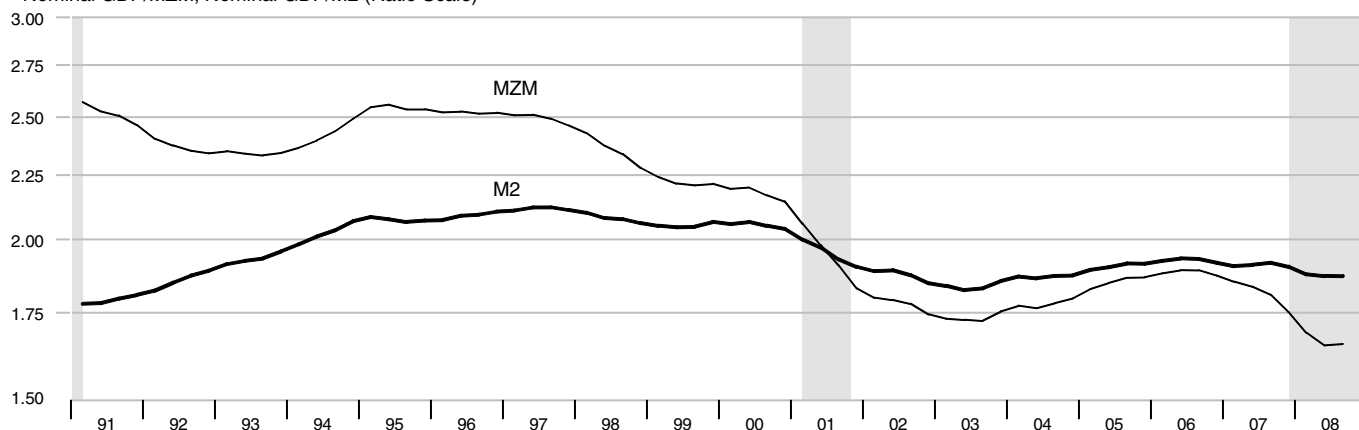
## Inflation-Indexed 10-Year Government Yield Spreads

Percent, weekly data



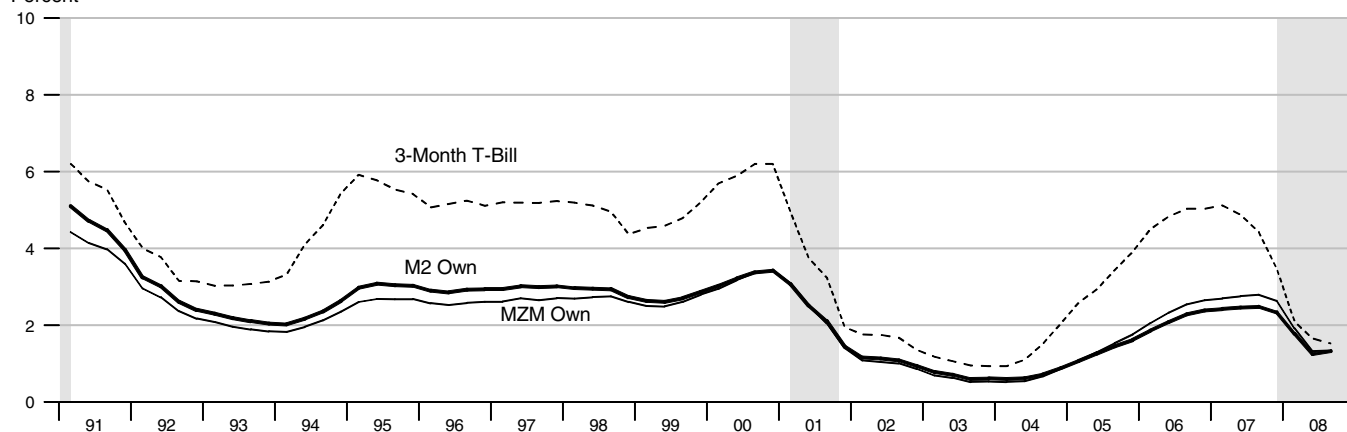
## Velocity

Nominal GDP/MZM, Nominal GDP/M2 (Ratio Scale)



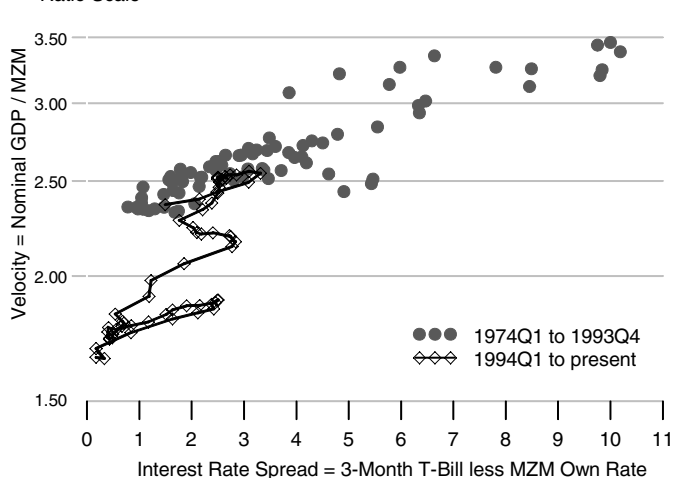
## Interest Rates

Percent



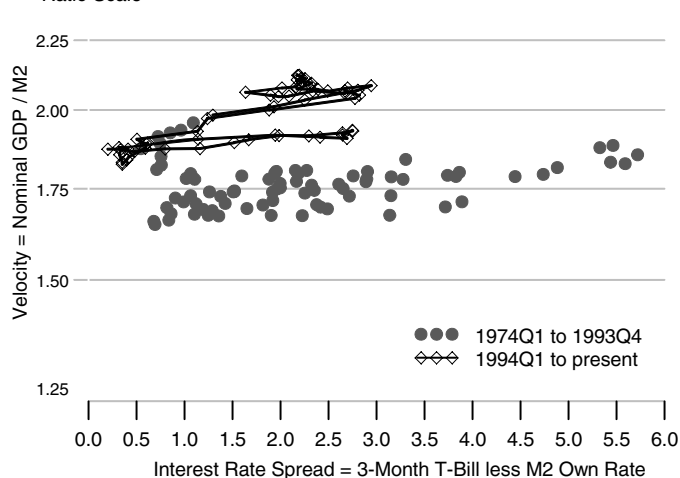
## MZM Velocity and Interest Rate Spread

Ratio Scale



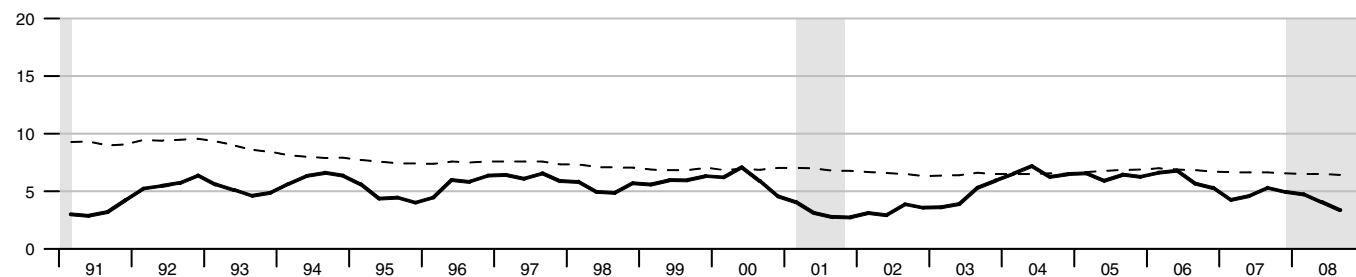
## M2 Velocity and Interest Rate Spread

Ratio Scale



## Gross Domestic Product

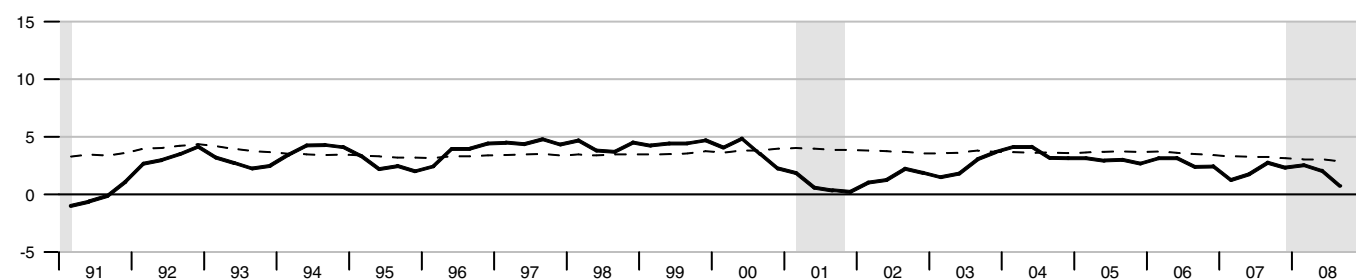
Percent change from year ago



Dashed lines indicate 10-year moving averages.

## Real Gross Domestic Product

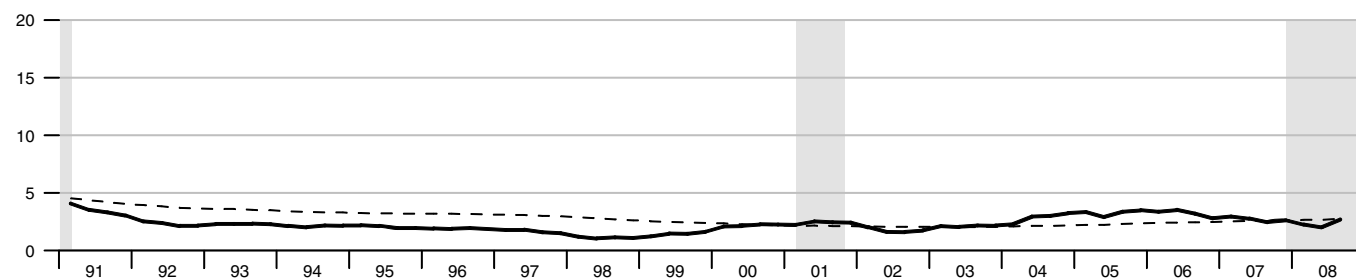
Percent change from year ago



Dashed lines indicate 10-year moving averages.

## Gross Domestic Product Price Index

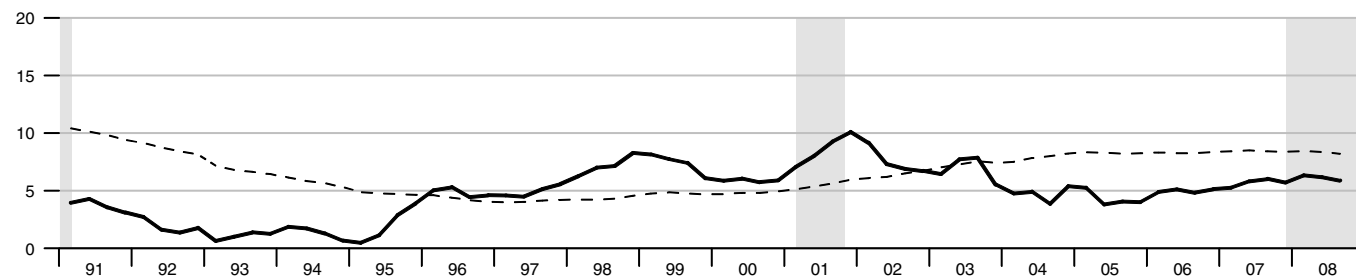
Percent change from year ago



Dashed lines indicate 10-year moving averages.

## M2

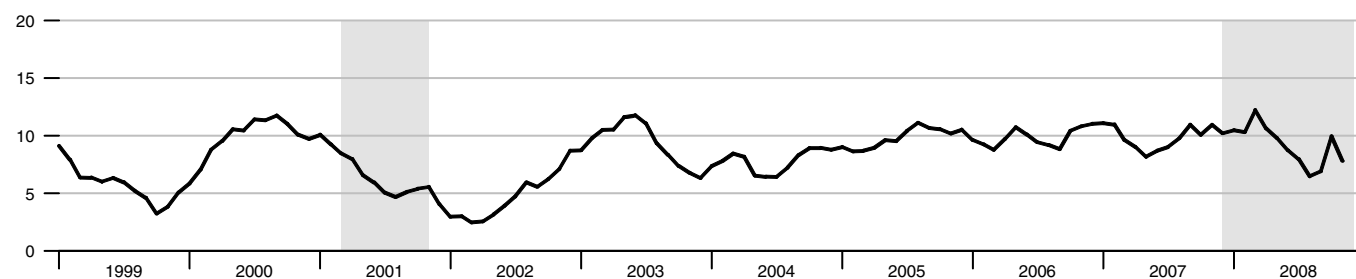
Percent change from year ago



Dashed lines indicate 10-year moving averages.

## Bank Credit

Percent change from year ago



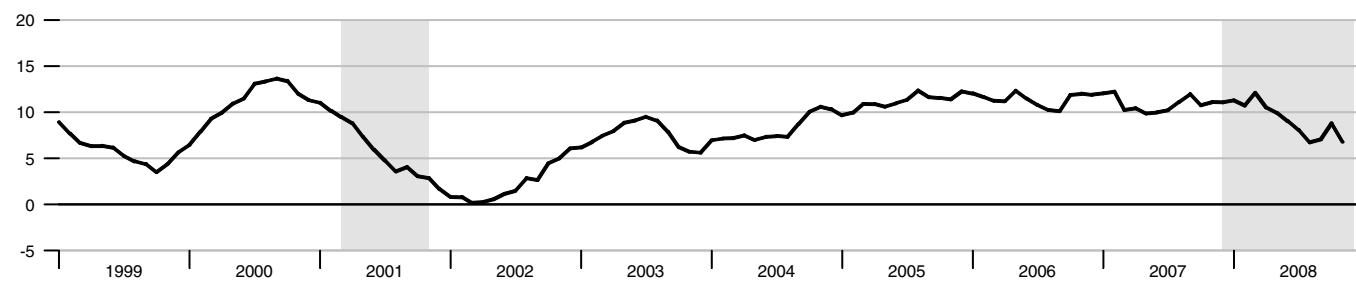
## Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago



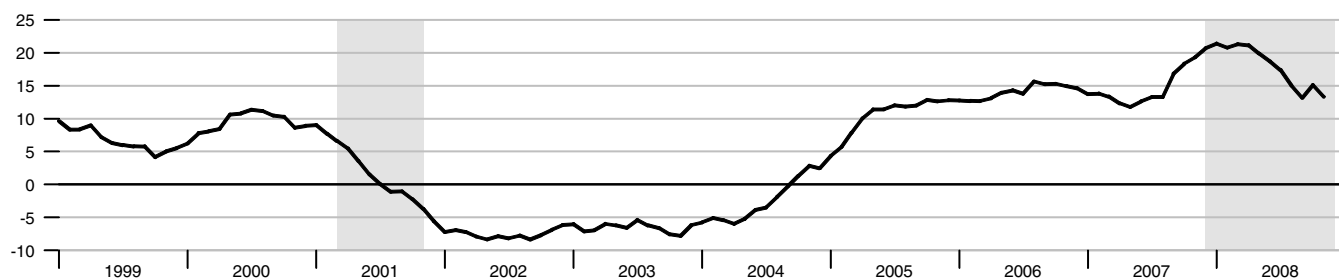
## Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago

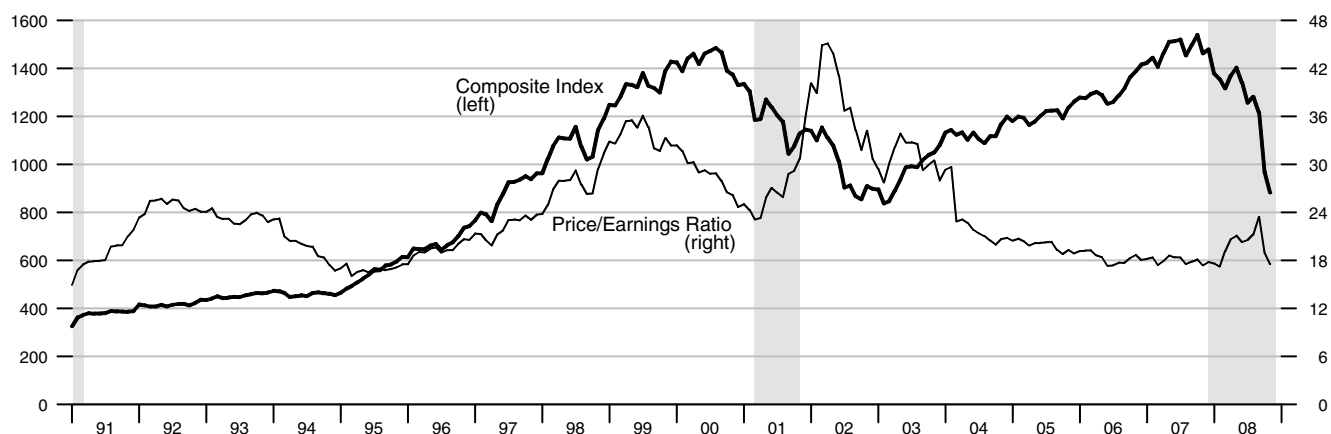


## Commercial and Industrial Loans at Commercial Banks

Percent change from year ago



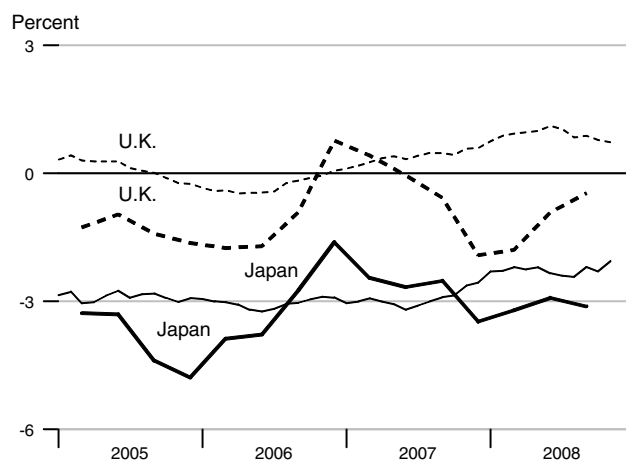
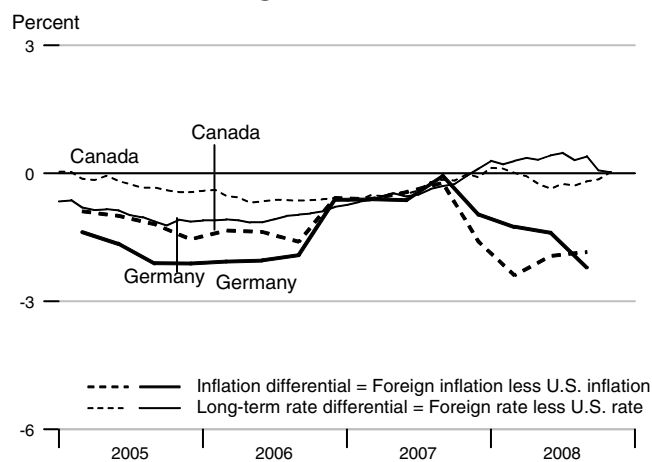
## Standard & Poor's 500



## Recent Inflation and Long-Term Interest Rates

	Consumer Price Inflation Rates				Long-Term Government Bond Rates			
	Percent change from year ago				Percent			
	2007Q4	2008Q1	2008Q2	2008Q3	Aug08	Sep08	Oct08	Nov08
United States	4.01	4.17	4.29	5.27	3.89	3.69	3.81	3.53
Canada	2.41	1.78	2.35	3.43	3.60	3.50	3.67	3.56
France	2.34	2.95	3.30	3.25	4.40	4.36	4.18	.
Germany	3.04	2.92	2.90	3.07	4.20	4.09	3.88	3.56
Italy	2.36	3.06	3.57	3.97	4.81	4.80	4.78	.
Japan	0.53	0.96	1.37	2.16	1.47	1.49	1.51	1.47
United Kingdom	2.09	2.38	3.37	4.81	4.73	4.57	4.59	4.26

## Inflation and Long-Term Interest Rate Differentials



		Money Stock				Bank	Adjusted		MSI M2**
		M1	MZM	M2	M3*	Credit	Monetary Base	Reserves	
2003		1273.484	6318.069	5967.902	8787.321	6118.965	740.938	93.325	315.192
2004		1344.422	6569.804	6249.938	9234.718	6595.303	776.768	96.129	329.873
2005		1371.780	6706.774	6517.356	9786.477	7244.411	806.628	96.560	343.539
2006		1374.386	6995.516	6842.574	10270.74	7957.069	835.040	94.913	
2007		1369.603	7626.162	7232.850		8743.261	850.579	94.200	
2006	1	1381.850	6891.629	6735.147		7621.981	830.534	96.495	
	2	1379.956	6945.088	6797.397		7883.622	836.387	95.082	
	3	1367.253	7006.517	6864.172		8037.411	834.610	94.829	
	4	1368.486	7138.831	6973.582		8285.262	838.627	93.247	
2007	1	1369.946	7296.282	7089.234		8426.733	846.309	94.122	
	2	1372.969	7486.247	7192.676		8563.836	849.919	93.558	
	3	1368.271	7713.138	7277.898		8834.559	852.267	95.428	
	4	1367.227	8008.981	7371.592		9147.916	853.820	93.691	
2008	1	1371.770	8385.198	7537.912		9354.687	856.319	96.177	
	2	1375.165	8669.495	7636.911		9395.761	859.325	94.389	
	3	1417.038	8723.358	7706.206		9463.136	892.683	117.644	
2006	Nov	1371.000	7129.412	6971.827		8275.310	840.308	94.689	
	Dec	1366.533	7202.966	7012.339		8353.446	837.690	91.097	
2007	Jan	1372.533	7246.756	7058.625		8393.897	843.494	94.186	
	Feb	1367.496	7288.538	7084.824		8460.088	847.258	94.424	
	Mar	1369.809	7353.552	7124.254		8426.215	848.174	93.757	
	Apr	1377.704	7431.242	7173.881		8506.124	848.961	93.602	
	May	1375.280	7489.817	7193.761		8563.942	849.615	92.772	
	Jun	1365.924	7537.682	7210.385		8621.443	851.181	94.299	
	Jul	1368.498	7593.947	7233.660		8705.282	851.858	94.605	
	Aug	1369.928	7722.440	7286.098		8842.142	853.438	96.648	
	Sep	1366.388	7823.027	7313.937		8956.252	851.505	95.031	
	Oct	1369.502	7925.050	7338.264		9057.141	856.459	93.524	
	Nov	1365.636	8015.346	7372.260		9180.290	857.515	95.757	
	Dec	1366.542	8086.547	7404.252		9206.317	847.487	91.793	
2008	Jan	1367.201	8173.321	7448.859		9274.087	851.441	95.083	
	Feb	1372.811	8412.755	7546.780		9334.512	856.944	96.197	
	Mar	1375.298	8569.517	7618.098		9455.461	860.571	97.250	
	Apr	1371.291	8628.204	7631.292		9409.527	855.241	94.379	
	May	1368.046	8676.222	7640.718		9403.261	859.685	94.935	
	Jun	1386.159	8704.059	7638.723		9374.494	863.050	93.853	
	Jul	1403.327	8734.164	7679.539		9398.997	870.540	96.796	
	Aug	1393.988	8724.133	7669.958		9415.207	871.333	96.423	
	Sep	1453.798	8711.777	7769.121		9575.203	936.176	159.713	
	Oct	1473.187	8714.926	7879.028		9957.134	1142.254	347.395	
	Nov	1522.484	8826.334	7933.985		9897.916	1480.846	673.758	

Note: All values are given in billions of dollars. \*See table of contents for changes to the series.

\*\*We will not update the MSI series until we revise the code to accommodate the discontinuation of M3.



		Federal Funds	Primary Credit Rate	Prime Rate	3-mo CDs	Treasury Yields			Corporate Aaa Bonds	Municipal Aaa Bonds	Conventional Mortgage
						3-mo	3-yr	10-yr			
2003		1.13	2.11	4.12	1.15	1.03	2.11	4.02	5.67	4.52	5.82
2004		1.35	2.34	4.34	1.56	1.40	2.78	4.27	5.63	4.50	5.84
2005		3.21	4.19	6.19	3.51	3.21	3.93	4.29	5.23	4.28	5.86
2006		4.96	5.96	7.96	5.15	4.85	4.77	4.79	5.59	4.15	6.41
2007		5.02	5.86	8.05	5.27	4.47	4.34	4.63	5.56	4.13	6.34
2006	1	4.46	5.43	7.43	4.72	4.50	4.58	4.57	5.39	4.29	6.24
	2	4.91	5.90	7.90	5.18	4.83	4.98	5.07	5.89	4.36	6.60
	3	5.25	6.25	8.25	5.39	5.03	4.87	4.90	5.68	4.13	6.56
	4	5.25	6.25	8.25	5.32	5.03	4.65	4.63	5.39	3.82	6.24
2007	1	5.26	6.25	8.25	5.31	5.12	4.68	4.68	5.36	3.91	6.22
	2	5.25	6.25	8.25	5.32	4.87	4.76	4.85	5.58	4.13	6.37
	3	5.07	5.93	8.18	5.42	4.42	4.41	4.73	5.75	4.27	6.55
	4	4.50	5.02	7.52	5.02	3.47	3.50	4.26	5.53	4.24	6.23
2008	1	3.18	3.67	6.21	3.23	2.09	2.17	3.66	5.46	4.39	5.88
	2	2.09	2.33	5.08	2.76	1.65	2.67	3.89	5.60	4.42	6.09
	3	1.94	2.25	5.00	3.06	1.52	2.63	3.86	5.65	4.46	6.31
2006 Nov		5.25	6.25	8.25	5.32	5.07	4.64	4.60	5.33	3.81	6.24
Dec		5.24	6.25	8.25	5.32	4.97	4.58	4.56	5.32	3.76	6.14
2007	Jan	5.25	6.25	8.25	5.32	5.11	4.79	4.76	5.40	3.89	6.22
	Feb	5.26	6.25	8.25	5.31	5.16	4.75	4.72	5.39	3.95	6.29
	Mar	5.26	6.25	8.25	5.30	5.08	4.51	4.56	5.30	3.88	6.16
	Apr	5.25	6.25	8.25	5.31	5.01	4.60	4.69	5.47	3.99	6.18
	May	5.25	6.25	8.25	5.31	4.87	4.69	4.75	5.47	4.04	6.26
	Jun	5.25	6.25	8.25	5.33	4.74	5.00	5.10	5.79	4.36	6.66
	Jul	5.26	6.25	8.25	5.32	4.96	4.82	5.00	5.73	4.24	6.70
	Aug	5.02	6.01	8.25	5.49	4.32	4.34	4.67	5.79	4.30	6.57
	Sep	4.94	5.53	8.03	5.46	3.99	4.06	4.52	5.74	4.26	6.38
	Oct	4.76	5.24	7.74	5.08	4.00	4.01	4.53	5.66	4.20	6.38
	Nov	4.49	5.00	7.50	4.97	3.35	3.35	4.15	5.44	4.26	6.21
	Dec	4.24	4.83	7.33	5.02	3.07	3.13	4.10	5.49	4.25	6.10
2008	Jan	3.94	4.48	6.98	3.84	2.82	2.51	3.74	5.33	4.13	5.76
	Feb	2.98	3.50	6.00	3.06	2.17	2.19	3.74	5.53	4.42	5.92
	Mar	2.61	3.04	5.66	2.79	1.28	1.80	3.51	5.51	4.63	5.97
	Apr	2.28	2.49	5.24	2.85	1.31	2.23	3.68	5.55	4.45	5.92
	May	1.98	2.25	5.00	2.66	1.76	2.69	3.88	5.57	4.34	6.04
	Jun	2.00	2.25	5.00	2.76	1.89	3.08	4.10	5.68	4.47	6.32
	Jul	2.01	2.25	5.00	2.79	1.66	2.87	4.01	5.67	4.44	6.43
	Aug	2.00	2.25	5.00	2.79	1.75	2.70	3.89	5.64	4.44	6.48
	Sep	1.81	2.25	5.00	3.59	1.15	2.32	3.69	5.65	4.49	6.04
	Oct	0.97	1.81	4.56	4.32	0.69	1.86	3.81	6.28	5.05	6.20
	Nov	0.39	1.25	4.00	2.36	0.19	1.51	3.53	6.15	4.78	6.09

Note: All values are given as a percent at an annual rate.

		M1	M2M	M2	M3*
Percent change at an annual rate					
2003		6.46	7.30	6.88	6.40
2004		5.57	3.98	4.73	5.09
2005		2.03	2.08	4.28	5.97
2006		0.19	4.31	4.99	4.95
2007		-0.35	9.01	5.70	
2006	1	1.98	5.38	6.12	
	2	-0.55	3.10	3.70	
	3	-3.68	3.54	3.93	
	4	0.36	7.55	6.38	
2007	1	0.43	8.82	6.63	
	2	0.88	10.41	5.84	
	3	-1.37	12.12	4.74	
	4	-0.31	15.34	5.15	
2008	1	1.33	18.79	9.02	
	2	0.99	13.56	5.25	
	3	12.18	2.49	3.63	
2006	Nov	2.70	7.67	6.10	
	Dec	-3.91	12.38	6.97	
2007	Jan	5.27	7.30	7.92	
	Feb	-4.40	6.92	4.45	
	Mar	2.03	10.70	6.68	
	Apr	6.92	12.68	8.36	
	May	-2.11	9.46	3.33	
	Jun	-8.16	7.67	2.77	
	Jul	2.26	8.96	3.87	
	Aug	1.25	20.30	8.70	
	Sep	-3.10	15.63	4.59	
	Oct	2.73	15.65	3.99	
	Nov	-3.39	13.67	5.56	
	Dec	0.80	10.66	5.21	
2008	Jan	0.58	12.88	7.23	
	Feb	4.92	35.15	15.77	
	Mar	2.17	22.36	11.34	
	Apr	-3.50	8.22	2.08	
	May	-2.84	6.68	1.48	
	Jun	15.89	3.85	-0.31	
	Jul	14.86	4.15	6.41	
	Aug	-7.99	-1.38	-1.50	
	Sep	51.49	-1.70	15.51	
	Oct	16.00	0.43	16.98	
	Nov	40.16	15.34	8.37	

\*See table of contents for changes to the series.

## Definitions

**M1:** The sum of currency held outside the vaults of depository institutions, Federal Reserve Banks, and the U.S. Treasury; travelers checks; and demand and other checkable deposits issued by financial institutions (except demand deposits due to the Treasury and depository institutions), minus cash items in process of collection and Federal Reserve float.

**MZM (money, zero maturity):** M2 minus small-denomination time deposits, plus institutional money market mutual funds (that is, those included in M3 but excluded from M2). The label MZM was coined by William Poole (1991); the aggregate itself was proposed earlier by Motley (1988).

**M2:** M1 plus savings deposits (including money market deposit accounts) and small-denomination (under \$100,000) time deposits issued by financial institutions; and shares in retail money market mutual funds (funds with initial investments under \$50,000), net of retirement accounts.

**M3:** M2 plus large-denomination (\$100,000 or more) time deposits; repurchase agreements issued by depository institutions; Eurodollar deposits, specifically, dollar-denominated deposits due to nonbank U.S. addresses held at foreign offices of U.S. banks worldwide and all banking offices in Canada and the United Kingdom; and institutional money market mutual funds (funds with initial investments of \$50,000 or more).

**Bank Credit:** All loans, leases, and securities held by commercial banks.

**Domestic Nonfinancial Debt:** Total credit market liabilities of the U.S. Treasury, federally sponsored agencies, state and local governments, households, and nonfinancial firms. End-of-period basis.

**Adjusted Monetary Base:** The sum of currency in circulation outside Federal Reserve Banks and the U.S. Treasury, deposits of depository financial institutions at Federal Reserve Banks, and an adjustment for the effects of changes in statutory reserve requirements on the quantity of base money held by depositories. This series is a spliced chain index; see Anderson and Rasche (1996a,b, 2001, 2003).

**Adjusted Reserves:** The sum of vault cash and Federal Reserve Bank deposits held by depository institutions and an adjustment for the effects of changes in statutory reserve requirements on the quantity of base money held by depositories. This spliced chain index is numerically larger than the Board of Governors' measure, which excludes vault cash not used to satisfy statutory reserve requirements and Federal Reserve Bank deposits used to satisfy required clearing balance contracts; see Anderson and Rasche (1996a, 2001, 2003).

**Monetary Services Index:** An index that measures the flow of monetary services received by households and firms from their holdings of liquid assets; see Anderson, Jones, and Nesmith (1997). Indexes are shown for the assets included in M2, with additional data at [research.stlouisfed.org/msi/index.html](http://research.stlouisfed.org/msi/index.html).

**Note:** M1, M2, M3, Bank Credit, and Domestic Nonfinancial Debt are constructed and published by the Board of Governors of the Federal Reserve System. For details, see *Statistical Supplement to the Federal Reserve Bulletin*, tables 1.21 and 1.26. MZM, Adjusted Monetary Base, Adjusted Reserves, and Monetary Services Index are constructed and published by the Research Division of the Federal Reserve Bank of St. Louis.

## Notes

**Page 3:** Readers are cautioned that, since early 1994, the level and growth of M1 have been depressed by retail sweep programs that reclassify transactions deposits (demand deposits and other checkable deposits) as savings deposits overnight, thereby reducing banks' required reserves; see Anderson and Rasche (2001) and [research.stlouisfed.org/aggreg/swdata.html](http://research.stlouisfed.org/aggreg/swdata.html). **Primary Credit Rate**, **Discount Rate**, and **Intended Federal Funds Rate** shown in the chart **Reserve Market Rates** are plotted as of the date of the change, while the **Effective Federal Funds Rate** is plotted as of the end of the month. Interest rates in the table are monthly averages from the Board of Governors H.15 Statistical Release. The **Treasury Yield Curve** and **Real Treasury Yield Curve** show constant maturity yields calculated by the U.S. Treasury for securities 5, 7, 10, and 20 years to maturity. **Inflation-Indexed Treasury Yield Spreads** are a measure of inflation compensation at those horizons, and it is simply the nomi-

nal constant maturity yield less the real constant maturity yield. Daily data and descriptions are available at [research.stlouisfed.org/fred2/](http://research.stlouisfed.org/fred2/). See also *Statistical Supplement to the Federal Reserve Bulletin*, table 1.35. The 30-year constant maturity series was discontinued by the Treasury as of February 18, 2002.

**Page 5:** **Checkable Deposits** is the sum of demand and other checkable deposits. **Savings Deposits** is the sum of money market deposit accounts and passbook and statement savings. **Time Deposits** have a minimum initial maturity of 7 days. **Large Time Deposits** are deposits of \$100,000 or more. **Retail** and **Institutional Money Market Mutual Funds** are as included in M2 and the non-M2 component of M3, respectively.

**Page 7:** **Excess Reserves plus RCB (Required Clearing Balance) Contracts** equals the amount of deposits at Federal Reserve Banks held by depository institutions but not applied to satisfy statutory reserve requirements. (This measure excludes the vault cash held by depository institutions that is not applied to satisfy statutory reserve requirements.) **Consumer Credit** includes most short- and intermediate-term credit extended to individuals. See *Statistical Supplement to the Federal Reserve Bulletin*, table 1.55.

**Page 8:** **Inflation Expectations** measures include the quarterly Federal Reserve Bank of Philadelphia *Survey of Professional Forecasters*, the monthly University of Michigan Survey Research Center's *Surveys of Consumers*, and the annual Federal Open Market Committee (FOMC) range as reported to the Congress in the February testimony that accompanies the Monetary Policy Report to the Congress. Beginning February 2000, the FOMC began using the personal consumption expenditures (PCE) price index to report its inflation range; the FOMC then switched to the PCE chain-type price index excluding food and energy prices ("core") beginning July 2004. Accordingly, neither are shown on this graph. **CPI Inflation** is the percentage change from a year ago in the consumer price index for all urban consumers. **Real Interest Rates** are ex post measures, equal to nominal rates minus year-over-year CPI inflation.

From 1991 to the present the source of the long-term PCE inflation expectations data is the Federal Reserve Bank of Philadelphia's *Survey of Professional Forecasters*. Prior to 1991, the data were obtained from the Board of Governors of the Federal Reserve System. Realized (actual) inflation is the annualized rate of change for the 40-quarter period that corresponds to the forecast horizon (the expectations measure). For example, in 1965:Q1, annualized PCE inflation over the next 40 quarters was expected to average 1.7 percent. In actuality, the average annualized rate of change measured 4.8 percent from 1965:Q1 to 1975:Q1. Thus, the vertical distance between the two lines in the chart at any point is the forecast error.

**Page 9:** **FOMC Intended Federal Funds Rate** is the level (or midpoint of the range, if applicable) of the federal funds rate that the staff of the FOMC expected to be consistent with the desired degree of pressure on bank reserve positions. In recent years, the FOMC has set an explicit target for the federal funds rate.

**Page 10:** **Federal Funds Rate and Inflation Targets** shows the observed federal funds rate, quarterly, and the level of the funds rate implied by applying Taylor's (1993) equation

$$f_t^* = 2.5 + \pi_{t-1} + (\pi_{t-1} - \pi^*)/2 + 100 \cdot (y_{t-1} - y_{t-1}^P)/2$$

to five alternative target inflation rates,  $\pi^* = 0, 1, 2, 3, 4$  percent, where  $f_t^*$  is the implied federal funds rate,  $\pi_{t-1}$  is the previous period's inflation rate (PCE) measured on a year-over-year basis,  $y_{t-1}$  is the log of the previous period's level of real gross domestic product (GDP), and  $y_{t-1}^P$  is the log of an estimate of the previous period's level of potential output. **Potential Real GDP** is as estimated by the Congressional Budget Office.

**Monetary Base Growth and Inflation Targets** shows the quarterly growth of the adjusted monetary base (modified to include an estimate of the effect of sweep programs) implied by applying McCallum's (1988, 1993) equation

$$\Delta MB_t^* = \pi^* + (10\text{-year moving average growth of real GDP}) \\ - (4\text{-year moving average of base velocity growth})$$

to five alternative target inflation rates,  $\pi^* = 0, 1, 2, 3, 4$  percent, where  $\Delta MB_t^*$  is the implied growth rate of the adjusted monetary base. The 10-year moving average growth of real GDP for a quarter  $t$  is calculated as the average quarterly growth during the previous 40 quarters, at an annual rate, by the formula

$((y_t - y_{t-40})/40) \times 400$ , where  $y_t$  is the log of real GDP. The 4-year moving average of base velocity growth is calculated similarly. To adjust the monetary base for the effect of retail-deposit sweep programs, we add to the monetary base an amount equal to 10 percent of the total amount swept, as estimated by the Federal Reserve Board staff. These estimates are imprecise, at best. Sweep program data are found at [research.stlouisfed.org/aggreg/swdata.html](http://research.stlouisfed.org/aggreg/swdata.html).

**Page 11: Implied One-Year Forward Rates** are calculated by this Bank from Treasury constant maturity yields. Yields to maturity,  $R(m)$ , for securities with  $m = 1, \dots, 10$  years to maturity are obtained by linear interpolation between reported yields. These yields are smoothed by fitting the regression suggested by Nelson and Siegel (1987),

$$R(m) = a_0 + (a_1 + a_2)(1 - e^{-m/50})/(m/50) - a_2 \cdot e^{-m/50},$$

and forward rates are calculated from these smoothed yields using equation (a) in table 13.1 of Shiller (1990),

$$f(m) = [D(m)R(m) - D(m-1)] / [D(m) - D(m-1)],$$

where duration is approximated as  $D(m) = (1 - e^{-R(m) \cdot m})/R(m)$ . These rates are linear approximations to the true instantaneous forward rates; see Shiller (1990). For a discussion of the use of forward rates as indicators of inflation expectations, see Sharpe (1997). **Rates on 3-Month Eurodollar Futures** and **Rates on Selected Federal Funds Futures Contracts** trace through time the yield on three specific contracts. **Rates on Federal Funds Futures on Selected Dates** displays a single day's snapshot of yields for contracts expiring in the months shown on the horizontal axis. **Inflation-Indexed Treasury Securities and Yield Spreads** are those plotted on page 3. **Inflation-Indexed 10-Year Government Notes** shows the yield of an inflation-indexed note that is scheduled to mature in approximately (but not greater than) 10 years. The current French note has a maturity date of 7/25/2015, the current U.K. note has a maturity date of 8/16/2013, and the current U.S. note has a maturity date of 1/15/2018. **Inflation-Indexed Treasury Yield Spreads** and **Inflation-Indexed 10-Year Government Yield Spreads** equal the difference between the yields on the most recently issued inflation-indexed securities and the unadjusted security yields of similar maturity.

**Page 12: Velocity** (for MZM and M2) equals the ratio of GDP, measured in current dollars, to the level of the monetary aggregate. **MZM and M2 Own Rates** are weighted averages of the rates received by households and firms on the assets included in the aggregates. Prior to 1982, the 3-month T-bill rates are secondary market yields. From 1982 forward, rates are 3-month constant maturity yields.

**Page 13: Real Gross Domestic Product** is GDP as measured in chained 2000 dollars. The **Gross Domestic Product Price Index** is the implicit price deflator for GDP, which is defined by the Bureau of Economic Analysis, U.S. Department of Commerce, as the ratio of GDP measured in current dollars to GDP measured in chained 2000 dollars.

**Page 14: Investment Securities** are all securities held by commercial banks in both investment and trading accounts.

**Page 15: Inflation Rate Differentials** are the differences between the foreign consumer price inflation rates and year-over-year changes in the U.S. all-items Consumer Price Index.

**Page 17: Treasury Yields** are Treasury constant maturities as reported in the Board of Governors of the Federal Reserve System's H.15 release.

## Sources

*Agence France Trésor*: French note yields.

*Bank of Canada*: Canadian note yields.

*Bank of England*: U.K. note yields.

*Board of Governors of the Federal Reserve System*:

Monetary aggregates and components: H.6 release. Bank credit and components: H.8 release. Consumer credit: G.19 release. Required reserves, excess reserves, clearing balance contracts, and discount window borrowing: H.4.1 and H.3 releases. Interest rates: H.15 release. Nonfinancial commercial paper: Board of Governors website. Nonfinancial debt: Z.1 release. M2 own rate.

*Bureau of Economic Analysis*: GDP.

*Bureau of Labor Statistics*: CPI.

*Chicago Board of Trade*: Federal funds futures contract.

*Chicago Mercantile Exchange*: Eurodollar futures.

*Congressional Budget Office*: Potential real GDP.

*Federal Reserve Bank of Philadelphia*: Survey of Professional Forecasters inflation expectations.

*Federal Reserve Bank of St. Louis*: Adjusted monetary base and adjusted reserves, monetary services index, MZM own rate, one-year forward rates.

*Organization for Economic Cooperation and Development*: International interest and inflation rates.

*Standard & Poor's*: Stock price-earnings ratio, stock price composite index.

*University of Michigan Survey Research Center*: Median expected price change.

*U.S. Department of the Treasury*: U.S. security yields.

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**Note:** \*Available on the Internet at [research.stlouisfed.org/publications/review/](http://research.stlouisfed.org/publications/review/).